nounces that he is about to incorporate them in a chart for France. Three memoirs have already been published as parts of this inquiry, embracing Tunis, Denmark, and Pointe du Raz in France. Among various other interesting results the curious fact has been deduced that where the race is of a mixed blonde and brunette character the hereditary blonde colouring is especially manifested in the eyes, while the brunette element has a tendency to reappear in the hair.—On the origin and intellectual evolution of the pointer dog, by M. C. A. Piètrement. This is a *résumé* by the author of a special section of his great work regarding the legislative enactments in force under the Frank kings of the two earliest dynasties, concerning domestic animals. Beginning with a notice of the fourteen species of house and sporting dogs to be recognized on the monuments of Egypt, Assyria, and Nineveh, he goes on to the references in Greek and Roman writers to the dogs known in their time, in which he finds no indication that pointers and setters existed in their present stage of development as sporting dogs before our era; while, on the other hand, he proves by extracts from the lists of birds and other animals used in the chase, given in the capitularies of Dagobert, that falconry, whose introduction into Western Europe is usually ascribed to the Crusaders, was practised in Gaul as early as the seventh century. The article although long and verbose, contains much interesting information regarding sport among the Franks and Gauls since the time of the Romans.—On the long bones found at Spy, by M. Topinard. The sudden angular deviation of the tibial bones leads to the inference that the lower extremities of the men of Spy were half-flexed, as is generally the case in the arboreal Anthropomorpha.—Cut flints found at Pierrefitte, by M. Simoneau. These finds were taken from the lime-beds of Toucy, and were obtained through the agency of shepherd-boys, successfully enlisted in the work of collecting.—On the grouping of pyramidal cellules in the motor region of the limbs, by M. Mahoudeau. These researches prove the existence of microscopic functional centres in certain parts of the brain, which may be regarded as the true physiological elements of the cerebral organ.—Replies made by M. Bink, while stationed in New Guinea, to the Society's printed category of questions regarding sociology and ethnography.—Report of M. Nicolas on the graves found in the gravel beds of Gadagno (Vaucluse), which he assumed to be of the Stone Age, but which are now shown to have a Ligurian character.—On the dolmens of Kergo, Carnac, by M. Gaillard, who, in another communication, treats of a curious circumstance in regard to the system of arrangement followed in the lines of menhirs in Morbihan. Here he found that a single stone, having a rounded top, was interposed at irregular distances between the regular lines of menhirs, which it always exceeded in height. Continued observations showed that on different and special days of the year, the sun appeared, at its rising, to rest upon the summit of one or other of these isolated menhirs.—On graves containing cinerary vessels belonging to the Polished Stone Age, in the *commune* of Montigny-l'Engrain, by M. Vauvillé.—Observations on the restoration of the tumulus of Kerlescan, by M. Gaillard. The cromlech, which has here been readjusted, consists of twenty-nine of the ancient menhirs, which had escaped destruction.—On the form of the wrist in supination and pronation, and on the differences of outline exhibited by the metacarpal bones when observed on the skeleton, or when the cuticle has been removed, and the muscles have been laid bare, by M. Cuyer, who writes for the artist rather than the anatomist, and illustrates his remarks by various useful woodcuts.—On the relative length, among various peoples, ancient and modern, of the index and ring finger, by Colonel Duhousset.—On the relative length of the two first toes in the Mongolian races, by Dr. Maurel.—On the significance of the practice of measuring the throat of young women, common among the peasantry of Brittany, as well as various Kabyle tribes, by M. Letourneau. Among these remotely separated peoples, similar notions prevail as to the connection between the volume of the neck in women and the age of puberty. The practices that have arisen from a popular belief in regard to this relation are so nearly alike in both instances as to suggest some common origin.—The importance of studying the character of the masticatory process and apparatus, in judging of the nature and habits of mammals, when considered from an anthropological point of view, by Dr. Fauvelle.—On the survival of communal proprietorship in the Morbihan, by M. Letourneau. In this district, various ancient customs still prevail, and in the Islands of Hœdic and Houat, the *curé*, assisted by a council of notables, governs the islands after a patriarchial or fatherly fashion.—A communication, by M. Variot, concerning a new method of effacing the traces of tattooing.

Rivista Scientifico-Industriale, December 31, 1888.—The Chladni figures and Wheatstone's methods, by Prof. Lodovico Malavasi. Here the author proposes to apply Wheatstone's theory on the acoustic vibrations of square plates to the explanation of the figures observed by Chladni in rectangular plates.—The same number contains some remarks by G. Cariati on Mr. Edison's perfected phonograph; and on the solar photographs taken by Prof. Riccò at the Observatory of Palermo.

SOCIETIES AND ACADEMIES.

London.

Linnean Society, February 7.—Mr. C. B. Clarke, F.R.S., Vice-President, in the chair.—The Rev. E. S. Marshall exhibited several interesting varieties of British plants collected by him in Scotland, and made remarks thereon.—Mr. E. M. Holmes exhibited a new British seaweed from Bognor, *Rhododermis elegans*, var. *polystromatica*, a variety new to science.—A paper was then read by Mr. A. D. Michael on three new species of parasitic *Acari* discovered by him in Derbyshire during the autumn of 1888. These were a *Myocoptes*, proposed to be called *M. tenax*, parasitic on the field vole, *Arvicola agrestis*; a *Symbiotes*, proposed to be called *S. tripilis*, parasitic upon the hedgehog; and *Goniomerus masculinus* (gen. et sp. nov.), a minute parasite found on the ear of the field vole. Specimens of all three were exhibited under the microscope, and a discussion followed, in which Profs. Mivart, Stewart, and Howes took part.—Prof. Martin Duncan then gave the substance of an important paper which he had prepared, entitled "A Revision of the Families and Genera of the *Echinoidea* Recent and Fossil." Reviewing the labours of his predecessors, Prof. Duncan traced the growth of the literature of his subject, and showed that, although many lists and papers had been published from time to time, no general review of the class *Echinoidea* had been attempted since 1846. Dealing with all the material at his command, he found it necessary to propose certain alterations in the classification, and to dispense with a good many genera and sub-genera which he considered had been needlessly founded. Above all, he had set himself the task of revising the descriptions of the genera, giving positive instead of comparative characters, a course which he believed would prove of great utility to students. The paper was criticized by Mr. Sladen, Prof. Stewart, and Mr. Breeze, all of whom testified to the necessity which had arisen for some authoritative revision of the subject such as had been undertaken by Prof. Duncan, whose researches would undoubtedly lighten very considerably the labours of future inquirers.

Physical Society, February 9.—Annual General Meeting.—Prof. Reinold, President, in the chair.—The Reports of the Council and Treasurer were read and adopted. From the former it appears that the number of members has only slightly increased during the year, due, it is supposed, to the advantages offered by the Society not being generally known, and a fly-leaf has been prepared, giving a short account of the Society's objects and procedure, copies of which may be obtained from the Secretaries. During the past year vol. i. Part 1, of "Physical Memoirs selected and translated from Foreign Sources," has been printed and issued to members; and the translations of important memoirs by Fourier, Hittorf, and Volta are well advanced, and will be published shortly. The Treasurer's Report showed the financial position of the Society to be very satisfactory. Owing to the lamented death of Prof. Clausius, a vacancy has occurred in the list of honorary members, to fill which Prof. R. W. Bunsen was nominated by the Council and duly elected. The following gentlemen were elected to form the new Council:—President: Prof. A. W. Reinold, F.R.S.; Vice-Presidents: Dr. E. Atkinson, Prof. W. E. Ayrton, F.R.S., Shelford Bidwell, F.R.S., the Right Hon. Lord Rayleigh, Sec. R.S.,; Secretaries: Walter Baily, Prof. J. Perry, F.R.S.; Treasurer: Prof. A. W. Rücker, F.R.S.; Demonstrator: C. Vernon Boys, F.R.S.; other Members of Council: Hon. R. Abercromby, T. H. Blakesley, W. H. Coffin, Conrad W. Cooke, Prof. O. Lodge, F.R.S., Prof. W. Ramsay, F.R.S., W. N. Shaw, Prof. S. P. Thompson, H. Tomlinson, and Dr. G. M. Whipple. Cordial votes of thanks were passed (1) to the Lords of the Committee of Council on Education for the use of the rooms and apparatus of the Normal School of Science; (2) to the Council and Officers of the Society for their services during the past year; and (3) to the Auditors, Mr. Inwards and Prof. Minchin, for examining the accounts. In returning thanks for the Council and Officers, the President attributed the great success of their meetings to the indefatigable zeal displayed by the Hon. Secretaries.—The meeting was then resolved into an ordinary science meeting.—Prof. A. S. Herschel, F.R.S., read a paper on physico-geometrical models, and exhibited a collection of geometrical figure models illustrating elementary forms of crystallographical and chemical form constructions. The subject, he said, had suggested itself to him as an important one for study some five years ago, from the possibility which he then discovered of effecting a four-limbed mechanical cycle, similar to a thermodynamic cycle, with a conically revolving pendulum, the mathematical conditions of whose motion involved the logarithum of the circle radius of the knob's revolution, as a quantity equivalent to entropy in the thermal cycle. The mechanical cycle may be effected as follows. Suppose the pendulum knob to be revolving at velocity V_1, and radius r_1; imagine the controlling force to decrease so that the radius varies from r_1 to r_2, the velocity remaining constant at V_1; then increase the controlling force to its original value, and simultaneously impart velocity to the knob to keep the radius constant at r_2, the final velocity being V_2. Next, further increase the controlling force so as to cause the radius to decrease to r_1 at velocity V_2; and finally, decrease the controlling force to its initial value, simultaneously retarding the knob till the velocity is V_1 at radius r_1. The net energy concerned in the operations was given as $W = (V_1^2 - V_2^2)\phi$; where $\phi = \log \frac{r_1}{r_2}$, and the cycle affords an illustration of transformation of gyratory motion into energy of reverberatory push along the axis. The logarithm ϕ is also measured by the area of a hyperbolic sector, and is connected (as was shown) with a sector of the circle which a lamp's conical beam would inscribe upon a square glass screen or plate dividing a long room of square cross-section into two parts. The conical beam prolonged through the glass then traces, on the walls beyond, hyperbolas, whose sectors from their summits are related to the circle's corresponding sectors by a well-known hyperbolocyclic trigonometrical connection. From this mode of constructing the connection, and from a discordance which it shows at the asymptote extremities with Euclid's definition of parallel straight lines, the author concludes that cubic space cannot be continuous in its structure, but must be, in a physically constructive sense, like material particles indestructively atomic or molecular. The models showed modes of constructing cubic space in various ways, chiefly by means of tetrahedra, octahedra, and dodecahedra, the common element of form in these being also shown to be the right-angled tetrahedron or "biquoin" obtained by dividing a cube into six equal parts by three planes through its diagonal. A model of Sir W. Thomson's soap foam figure, and some wooden models representing Haüy's polyhedral atoms and their combinations, were exhibited to illustrate the structural view thus taken of geometry; and chemical-figure models of the ring of tetrahedral carbon molecules in benzene, and of the asymmetric groups of similar atoms in active and inactive tartaric acid, were shown.

Zoological Society, February 5.—Dr. St. George Mivart, F.R.S., Vice-President, in the chair.—The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of January 1889.—Mr. Sclater exhibited a living specimen of the Thick-billed Lark (*Rhamphocoris clotbeyi*) lately received by the Society from Southern Algeria, and called attention to its structural peculiarities.—Mr. G. A. Boulenger read a paper on the species of Batrachians of the genus *Rhacophorus*, hitherto confounded under the name of *R. maculatus*, and pointed out their distinctions.—Mr. Sclater pointed out the characters of some new species of birds of the family Dendrocolaptidæ, which were proposed to be called *Upucerthia bridgesi*, *Phacellodomus rufipennis*, *Thripophaga fusciceps*, *Philydor cervicalis*, and *Picolaptes parvirostris*.—A communication was read from the Rev. O. P. Cambridge on some new species and a new genus of Araneidea. Two of these species (*Pachylomenus natalensis* and *Stegodyphus gregarius*) were based on specimens living in the Insect-house in the Society's Gardens.—A communication was read from Prof. F. Jeffrey Bell, containing descriptions of new or rare Holothurians of the genera *Plexaura* and *Plexaurella*.—Dr. Günther, F.R.S., exhibited and made remarks on some fishes which had been dredged up by Mr. John Murray off the west coast of Scotland, and were not previously known to occur in British waters, viz. *Cottus lilljeborgii* (Collett), *Triglops murrayi*, sp. n., *Gadus esmarckii* (Nills.) *Onus reinhardti* (Collett), *Fierasfer acus* (Brünn.), *Scopelus scoticus*, sp. n., and *Stomias ferox* (Rnhrdt.).—Dr. Günther also exhibited and described a specimen of *Lichia vadigo* (Risso), a species of which only a few specimens were previously known from the Mediterranean and Madeira. This specimen was obtained by Captain MacDonald on September 17, 1888, off Waternish Point, Isle of Skye. He also exhibited a hybrid between the Roach (*Leuciscus rutilus*) and the Bleak (*Alburnus alburnus*), sent to him by Lord Lilford from the River Nun, Northamptonshire.—Mr. Beddard read a paper descriptive of the coloured epidermic cell of *Æolosoma tenebrarum*.—Mr. Boulenger exhibited and made marks on a series of living specimens of Tortoises of the genus *Homopus* from Cape Colony, lately received by the Society from the Rev. G. H. R. Fisk, C.M.Z.S.

Geological Society, February 6.—W. T. Blanford, F.R.S., President, in the chair.—The following communication was read:—On the occurrence of Palæolithic flint implements in the neighbourhood of Ightham, Kent, their distribution and probable age, by Joseph Prestwich, F.R.S. The author stated that Mr. Harrison, of Ightham, has discovered over 400 Palæolithic implements lying on the surface at various heights and over a wide area around Ightham. A description of the physiography of the district and of the distribution of the various gravels and drifts was given, and in the absence of fossils, attention was called to the different levels at which the deposits occurred, and to their physical features and characters. Besides the river-gravels, two groups of unclassed gravels were described, one occupying a low level, and the other levels higher than that to which the river-drifts reach; the latter is of varied composition. In the case of the Shode valley, only beds below the contour-level of 350 feet in its upper part, and of 300 feet or less in its lower part, can be referred to the former action of the Shode, and those above this belong to a high-level drift of uncertain age. The composition of the various gravels was described in detail. The implements are found on the surface of the land at all levels up to 600 feet, and Mr. Harrison has discovered them at forty localities in the hydrographical basins of the Shode, the Darent, the Leybourne stream, and in part of the Thames basin. Two groups of implements extend far beyond the limits assigned to the river-drifts formed since the present hydrographical basins were established, and must be accounted for by some other means than those in connection with the former *régime* of the existing streams. A description of the general characters and variations observable in the implements was given. It is evident from the condition of most of the implements, that they have been embedded in some matrix which has produced an external change of structure and colour. In the case of the river-gravel sites, the question presents no difficulty. Three cases of implements have been found: (i.) where the flint still shows some of its original colour; (ii.) those of which the surface has turned from black to white, has been altered in structure, and acquired a bright patina, and which show no trace of wear; (iii.) those of which the flint has also lost its original colour, but has been stained, and is with or without patina,—these are generally much rolled. The characters of the first call for no comment. Those of (ii.) and (iii.) are very marked, and there is no difficulty in referring each to a distinct matrix. The implements of class ii. have been embedded in a stiff brick-earth, generally of a reddish colour, and those of class iii. seem to have lain in ferruginous beds of sand or gravel. Reasons were given for supposing the surface to have been once covered with a deposit of clay or loess, since denuded except where preserved in pipes, and that a continuous plane descended from the high range of the Lower Greensand to the Thames Valley, which has since been lowered 300 feet or more. It was also shown that the high-level deposits were formed anteriorly to the post-glacial drifts of the Medway and Thames Valleys. It is probable that the loess is a deposit from flood-waters, and that some of it may be referred to the Medway flowing at a higher level; but the highest deposits cannot be so accounted for, and the author referred to the possibility of glacial action, without insisting on it. The deposit on the chalk-plateau is abruptly cut off by the river-valleys, and the rudest forms of implements, such as those of Ash and Bower Lane, occur on this plateau at from 500 to 550 feet, and the author thinks they may possibly be of pre-glacial age. The changes which have taken place in the physiography of the district, and the great height of the ol chalk-plateau, with its clay-with-flints and southern drifts, poin to long intervals of time, and to the great antiquity of the rude implements found in association with these drifts. That the removal of the material indicates the existence of agents of greater force than those operating under the present river *régime* closes up the time required for the completion of the great physical phenomena, though the author's inquiry tends to carry man further back geologically than is usually admitted. After the reading of the paper there was a discussion, in which Dr. Evans, Mr. Topley, and others took part.

Entomological Society, February 6.—The Right Hon. Lord Walsingham, F.R.S., President, in the chair.—The President announced that he had nominated Captain H. J. Elwes, Mr. F. Du Cane-Godman, F.R.S., and Dr. Sharp, Vice-Presidents for the session 1889-90.—Lord Walsingham exhibited a larva of *Lophostethus dumolini*, Guer., sent to him by Mr. Gilbert Carter, from Bathurst, West Coast of Africa.—Mr. G. T. Porritt exhibited several melanic specimens of *Boarmia repandata* from Huddersfield, and, for comparison, two specimens from the Hebrides. Mr. McLachlan, F.R.S., remarked that melanism appeared to be more prevalent in Yorkshire and the North Midlands than in the more northern latitudes of the United Kingdom.—Captain Elwes read a paper entitled "On the Genus *Erebia*, and its Geographical Distribution." The author, after referring to the number of species and named varieties, many of which appeared to be inconstant as local forms, made some remarks on the nomenclature of the genus, and suggested that a better system of classification might be arrived at by anatomical investigation. It was stated that little was known of the early stages and life-history of species of this genus, the geographical distribution of which was Alpine rather than Arctic. The author remarked that it was curious that there was no species peculiar to the Caucasus, and that no species occurred in the Himalayas, where the genus is replaced by *Callerebia;* that none were found in the Himalo-Chinese sub-region, and none in the Eastern United States of America. He also called attention to the similarity of the species in Colorado and North-West America to the European species. Lord Walsingham, Mr. Waterhouse, Mr. O. Janson, Mr. McLachlan, Dr. Sharp, and Mr. Jenner-Weir took part in the discussion which ensued.—Mr. W. Warren read a paper entitled "On the *Pyralidina* collected in 1874 and 1875 by Mr. J. W. H. Traill in the basin of the Amazons."—Mr. C. J. Gahan read a paper entitled "Descriptions of New or little-known Species of *Glenea* in the Collection of the British Museum."—Dr. J. S. Baly communicated a paper entitled "Notes on *Aulocophora* and Allied Genera."

PARIS.

Academy of Sciences, February 11.—M. Des Cloizeaux, President, in the chair.—On the loss of gaseous nitrogen during the decay of organic substances, by M. Th. Schlœsing. In continuation of his previous communication of February 4, he gives the results of some of the experiments already described.—Fresh researches showing that the toxic property of exhaled air does not depend on the carbonic acid, by MM. Brown-Séquard and d'Arsonval. In three previous communications (November 28, 1887, and January 9 and 16, 1888) the authors showed the nature of the relations existing between pulmonary tuberculosis and the air exhaled from the lungs of human beings and domestic animals, as well as the toxic property of one or more substances derived from the lungs. Fresh researches here described show that the poison or poisons escaping with the exhaled air may kill even in small doses, and even without being injected directly into the arterial or venous blood. Subcutaneous injection killed seventeen of eighteen rabbits operated on, generally within twelve to twenty-four hours. In a large number of cases they found that pure carbonic acid (not charged with the vapours of hydrochloric acid) may be inhaled in considerable quantity in the atmospheric air by human beings, dogs, rabbits, and other mammals. The authors themselves breathed for over one or two hours an atmosphere containing 20 per cent of CO_2 without any marked inconvenience, and especially without any lasting consequence. Other still more crucial experiments satisfied them that the fatal results are due, not to the carbonic acid, but to some other toxic substances exhaled by patients suffering from pulmonary affections.—On the invasions of locusts in Algeria, by M. J. Künckel d'Herculais. A careful study of the available documents has convinced the author that the most disastrous years (1845, 1866, 1874) are those that coincide with the simultaneous appearance of the indigenous species (*Stauronotus maroccanus*) and of the foreign variety (*Acridium peregrinum*) arriving from Central Africa.—Observations of the new planet discovered on February 8 at the Observatory of Nice, by M. Charlois. This planet, which is of 12·5 magnitude, is the second discovered by the young astronomer within a fortnight.—On the reductions of the problem of *n* bodies preserving certain mutual distances, by M. Andrade. It is here shown that the already communicated solution of this problem for a particular case is the most general possible.—On the phenomena of electrolysis, by MM. Violle and Chassagny. The decomposition of water by means of an energetic current is accompanied by luminous and calorific phenomena, which were described by Fizeau and Foucault over forty years ago, and afterwards studied by many physicists. By employing a Gramme machine of 40 amperes with an electromotor force of 110 volts, the authors have been enabled easily to produce these phenomena, to observe them under clearly defined conditions, and to record some hitherto unnoticed circumstances, which are here described.—On the actinometric observations made at Kief, by M. R. Savelief. These observations had special reference to the phenomenon of solar radiation during the year 1888, and to the determination of the solar constant at Kief. M. Savelief's paper was followed by some remarks by M. A. Crova, who directed attention to the great interest it presented, as showing that the law of the annual variations of solar radiation is practically the same at Kief as at Montpellier; that the calorific transparency is greater at the former than at the latter station, and that the solar constant determined on a clear winter's day in Russia may attain the value of 3 calories. This is higher than any recorded at Montpellier, and approached only by the records of an actinometer placed on the summit of Mount Ventoux, which are about the same as those obtained by Mr. Langley during his remarkable researches on the top of Pike's Peak, Colorado.—On some reactions of the chlorides of mercurammonium, by M. G. André. After concluding his researches relative to the decomposing action of water on the amidochloride (*Comptes rendus*, cviii. p. 233), M. André determines the conditions under which the chloride of dimercuriammonium is transformed to amidochloride at contact with sal-ammoniac.—On amorphous bismuth, by M. F. Hérard. The author has succeeded in obtaining this substance by applying to bismuth the same process that he had already employed to obtain amorphous antimony, as described in the *Comptes rendus* for August 13, 1888.—Syntheses effected by means of cyanosuccinic ether, by M. L. Barthe. In a previous note (*Comptes rendus*, cvi. p. 143), MM. Barthe and Haller described the preparation of cyanosuccinic ether, obtained by making monochloracetic ether react on sodium cyanacetic ether. By means of that ether they have now obtained the following syntheses: (1) methyl cyanosuccinic ether; (2) ethylcyanosuccinic ether; (3) ethylethenyltricarbonic ether; (4) propylcyanosuccinic ether, of which the respective formulas are given.—Discovery of a new Quaternary station in Dordogne, by M. Émile Rivière. This station, to which M. Rivière has given the name of Pageyral, in honour of M. Mercier-Pageyral, lies about 2 kilometres from the celebrated Cro-Magnon Cave on the left bank of the Vézere nearly opposite Laugerie, and facing the islet of Malaga. A first exploration has yielded the remains of the reindeer, *Cervus elaphus*, *Cervus capreolus*, *Sus scrofa*, *Canis aureus*, besides various objects of human workmanship characteristic of the Madeleine epoch, such as flint knives, scrapers, arrow-heads, cores, and numerous chippings.

BERLIN.

Physiological Society, January 18.—Prof. du Bois-Reymond, President, in the chair.—Dr. Baginski gave an account of his further researches on the Bacteria which occur in the fæces of children fed on milk. Of the two Bacteria which are thus found—namely, *Bacterium lactis* and *Bacterium coli*—he had previously experimented with the first, and proved that it does not induce a lactic acid, but an acetic acid fermentation of milk-sugar, and should hence more appropriately receive the name of *Bacterium aceti*. Recently he has investigated the *Bacterium coli*. Sown in a solution of milk-sugar it produces no change, but when some white of egg is mixed with it a fermentation is set up, not only when the access of air is permitted, but also when it is prevented. The products of this fermentation were proved to be, by an elaborate series of chemical investigations, lactic, acetic, and formic acids, the occurrence of the latter being proved by crystallographic measurements of its barium salts. Both the Bacteria exert an influence which is antagonistic to the development of any alkaline fermentations or decompositions.—Dr. A. König gave an account of his experiments on the action of santonate of soda on the perception of colours. As is well known, a distinction is drawn between congenital and acquired anomalies of the colour-sense (colour-blindness); of these the first only gives rise to colour-blindness to red or green, while colour-blindness to violet is never observed as a congenital defect. On the other hand, it was supposed that, in the anomalous perception of colour which results from the action of santonin or santonate of soda, we had to deal with a typical case of acquired colour-blindness to violet. The speaker had hence been led to make a number of experiments with santonate of soda on himself, and, apart from the fact that as soon as its action is manifest all objects appear of a yellow colour, had established the following phenomena. The spectrum ceases to be visible on the hinder side of the blue, and not a trace of violet is ever visible; the neutral point, as deduced from closely-agreeing measurements, is situated at wave-length 573—that is to say, exactly at that point which is complementary to the missing violet. The speaker based upon these observations the conclusion that the visual phenomena which are observed after the administration of santonin are not really of the nature of colour-blindness to violet, but can be completely explained by the assumption that the violet rays are absorbed by those media of the eye which have been affected by the drug. Prof. Preyer was unable to agree with the above conclusion, speaking with the experience of the experiments he had himself made with santonate of soda in 1868. The fact that after the administration of the drug the violet part of the spectrum can be seen when it is looked at not directly but indirectly, is opposed to Dr. König's views—that is to say, when its image is allowed to fall upon peripheral parts of the retina. Moreover, Prof. Preyer stated that he experienced a distinct sensation of violet when he had taken the drug while his eyes were closed, and then opened them after the action of the drug had become manifest. He believes that the visual phenomena which accompany the action of santonin can only be explained by assuming that it affects the central nervous system, and that this view is supported by the abnormal gustatory, olfactory, and auditory sensations which are simultaneously observed.—The President communicated some instances of the occurrence of real gustatory and olfactory dreams.

Physical Society, January 25.—Prof. von Helmholtz, President, in the chair.—Dr. A. König spoke on the dependence of visual acuteness upon the intensity of light when objects are illuminated by spectral colours, his remarks being based upon experiments made by Dr. Uhthoff. Earlier researches have shown that, for red, yellow, and green light, the visual acuteness increases at first very rapidly, then more slowly, and then finally shows scarcely any further change as the intensity of the illumination is increased; and that the curve of visual acuteness on the abscissæ which represent the varying intensity of illumination is a parabola, whereas with blue light the curve is a straight line. Dr. Uhthoff had repeated these experiments with spectral colours, taking care that the several lights used were in all cases of equal intensity, a result obtained by altering the width of the slit. The speaker described fully the apparatus he had used, and the series of preliminary experiments he had made, by which he had proved that the narrower the slit is in the screen upon which the spectrum falls, the greater is the acuteness of vision, and that the observations are more trustworthy when a dark mark on a light ground is used as the object whose brightness is to be determined than when a light mark on a dark ground is employed. As regards the apparatus it may be mentioned that the dispersion is produced by a fluid-prism 1 decimetre in diameter. The result of these experiments, as of former ones, was that the visual acuteness increases with the intensity of light in the blue part of the spectrum. When the visual acuteness is compared in the different spectral colours, the intensity of light being in all cases the same, a curve is obtained with a maximum lying near its centre. When the intensity of the light is less, the curve of acuteness on the abscissæ of the spectral colours becomes more pointed, and the maximum moves simultaneously towards the red end. When the intensity of light is the least possible, the maximum for the visual acuteness coincides with the point of greatest brightness in the spectrum. The above holds good not only for the normal trichromatic eye, but also for the dichromatic or red- and green-colour-blind eye.—Prof. Kundt exhibited a photograph of the spectrum of cyanogen extending from the line H up to about the line L, which had been sent to him by Prof. Keyser, of Hanover. For size, beauty, and clearness of the several groups of lines, this photograph is scarcely likely to find its equal.

AMSTERDAM.

Royal Academy of Sciences, January 26.—M. Buys Ballot communicated the results of his observations during the last forty years at the Meteorological Institute at Utrecht, and stated how much temperature, air-pressure, and rain deviated to the right or left from the mean values, and how long this occasionally continues on a stretch before compensation comes about.—M. Beyerinck spoke on a method of determining the action of different substances on the growth and on some other vital functions of micro-organisms, and illustrated his assertions by preparations. The method consists in applying small quantities of various substances on gelatine plates, either pure or prepared for the purpose, and infected with yeast or Bacteria of some kind or other, and then watching if the micro-organisms in the centres of diffusion of those substances—whether remaining pure or meeting each other on their way—multiply or not, or if they do so in a greater or less degree.

BOOKS, PAMPHLETS, and SERIALS RECEIVED

Electrical Trades Directory and Hand-book, 1889 (*Electrician* Office).—The Elementary Principles of Electric Lighting, 2nd edition: A. A. C. Swinton (Lockwood).—A Dictionary of Photography: E. J. Wall (Hazell).—A Manual of Cursive Shorthand: H. L. Callendar (Clay).—The Chemical Analysis of Iron: A. A. Blair (Whittaker).—Hourly Readings, 1886, Part 1, January to March (Eyre and Spottiswoode).—Greek Geometry from Thales to Euclid: G. J. Allman (Longmans).—*Challenger* Report, Zoology, vol. xxix. Text, 2 Parts (Eyre and Spottiswoode).—The First Ascent of the Kasaï: C. S. L. Bateman (Philip).—Therapeutics ought to become a Science: Dr. W. Sharp (Bell).—Therapeutics can become a Science: Dr. W. Sharp (Bell).—The Great Lake Basins of the St. Lawrence: A. T. Drummond.—La Pénétration de la Lumière dans les Lacs d'Eau Douce: Dr. Forel (Leipzig, Engelmann).—Die Zusammendrückbarkeit des Wasserstoffes: S. von Wroblewski (Wien, Tempsky).—Eskimo of Hudson's Strait: F. F. Payne (Toronto).—The Navajo Tanner: R. W. Shufeldt.—Journal of the Anthropological Institute, February (Trübner).—Natural History Transactions of Northumberland, Durham, and Newcastle-upon-Tyne, vol. x. Part 1 (Williams and Norgate).—Journal of the Royal Microscopical Society, December 1888 to February 1889 (Williams and Norgate).—Rendiconto dell' Accademia delle Scienze Fisiche e Mathematiche (Sezione della Società Reale di Napoli) Serie 2a, vol. ii. Fasc. 1° to 12° (Napoli).

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